
PhD position F/M in soft matter physics: Hybrid nanocomposites for enhanced ion transport

University of Montpellier (France)

Ionic conductivity is a key property for emerging energy technologies and, in particular, the new generation of solid-state batteries for electric vehicles. In a joint project between the 'Laboratoire Charles Coulomb' (L2C) and the 'Institut Charles Gerhardt de Montpellier' (ICGM), we will explore how ionic transport processes in polymerized ionic liquids can be simultaneously enhanced by incorporating ionic liquids of high ionic conductivity and an innovative solid conductive network of ionosilica to control the mechanical strength.

As a part of this project, the candidate will be in charge of the structural and dynamical study of nanostructured composites at L2C. He/she will investigate the ion conducting properties of various ionic materials: ionic liquids, ionosilicas, polymerized ionic liquids, in link with their morphology and relaxation behavior. The microstructure will be studied by small-angle scattering techniques (of neutrons and X-rays) possibly coupled to numerical simulations if the candidate is interested by this aspect. The dynamical properties will be mostly investigated by broadband dielectric spectroscopy, and Brillouin scattering will give access to the mechanical properties. The synthesis and chemical characterization of these materials will be handled by a second PhD student already working at ICGM.

The candidate will be supervised by A.C. Genix and J. Oberdisse whose expertise lies in structural and dynamical studies at the nanoscale in complex polymer systems and nanocomposites. He/she should have a strong background in materials or polymer physics. Good communication skills, notably in English (oral and written), are mandatory.

Application deadline: September 1st, 2022

Starting date: November 1st 2022

Duration: 36 months – PhD funding is acquired.

Contact: **Julian Oberdisse**
Director of research at CNRS

Anne-Caroline Genix
Associate Professor

Laboratoire Charles Coulomb
Place Eugène Bataillon
34095 Montpellier cedex 05

julian.oberdisse@umontpellier.fr
anne-caroline.genix@umontpellier.fr